A6.11 Energy Plant Specifications

A6.10.1 The proposed development will be provided with condensing natural gas-fired boilers and several diesel generator sets. Specifications for these plant are shown in Table A6.11.1 and Table A6.11.2.

A6.10.2 In order to ensure that the final plant design does not lead to impacts greater than those modelled, it must adhere to the following minimum specifications:

- a stadium boiler system to be comprised of units totalling a maximum of 5600 kW fuel input that must share two common flue outlets; a residential boiler system to be comprised of units totalling a maximum of 4,400 kW fuel input with a single common flue outlet; a hotel boiler system to be comprised of units totalling a maximum of 3,200 kW fuel input with a single common flue outlet; an extreme sport boiler system to be comprised of units totalling a maximum of 564 kW fuel input with a single common flue outlet; all with a maximum exit diameter to ensure a minimum actual velocity of 7.5 m/s terminating at least 1 m above the roof level;
- the compression ignition diesel generators with a maximum NOx emission limit of EU Stage IIIA generators (3.5 g/kWh of NOx and 0.2 g/kWh of PM); the stadium generators will be comprised of two flues with an outlet velocity of 31 m/s;
- all stacks should discharge vertically upwards and be unimpeded by any fixture on top of the stack (e.g., rain cowls or 'Chinaman's Hats');
- the system must be designed to conform to the requirements of the GLA's guidance on sustainable design and construction (GLA, 2014a). The gas boilers will therefore conform to a maximum NOx emission of <40 mg/kWh. The SPG makes clear that the emission standards are 'end-of-pipe' concentrations expressed at specific reference conditions for temperature, pressure, oxygen and moisture content. Compliance with these standards will be confirmed prior to occupation, based on:
  - monitoring undertaken on the actual installed plant; or
  - manufacturer guaranteed performance levels supported by type approval monitoring undertaken by the equipment supplier.
- in order to attain these values, relevant catalyst or alternative abatement will be required.

A6.10.3 If the design of the energy plant provision deviates significantly from the modelled specification, additional future modelling may be required.

A6.10.4 The GLA's Sustainable Design and Construction SPG (GLA, 2014a) also states that the measures set out in Technical Guidance Note D1 (Dispersion) (HMSO, 1993b) should also be adhered to, to ensure adequate dispersion of emissions from discharging stacks and vents. These include the following:

- Discharges should be vertically upwards and unimpeded by cowls or any other fixtures on top of the stack. However, the use of coning or of flame traps at the tops of stacks is acceptable. In the case of discharge stacks (whether single or multiple stack) with shrouds or casings around the stack(s), the stack(s) alone should extend above the shroud or casing. This extension should be at least 50% of the shroud or casing's greatest lateral dimension;
- Irrespective of the pollutant discharge, there are minimum discharge stack heights based on the heat release and the discharge momentum. These can be calculated following calculations set out in the guidance note, but the absolute minimum value is 1 m;
- No discharge stack should be less than 3 m above the ground or any adjacent area to which there is general access. For example, roof areas and elevated walkways;
- A discharge stack should never be less than the height of any building within a distance of 5 times the stack height; and
- A discharge stack should be at least 3 m above any opening windows or ventilation air inlets within a distance of 5 times the stack height.

A6.4. Table A6.11.1: Combined Boiler Plant Specifications

Parameter	Stadium	Residential	Hotel	Extreme	Restriction
Max Power Out (kWel)	5.350	4.264	3.152	555	-
Net Fuel Input of All Plant (kW)	5.600	4,400	3.208	564	Max
Gross Fuel Input for All Plant (kW)	6.200	4,880	3.554	624	Max
Excess Air (%)	27	27.5	34	34	Min
Condensing	Yes	Yes	Yes	Yes	-
Height of release (m)	56.3	121.0	90.2	54.2	Min
Actual Exhaust Velocity (Am/s) per stack	7.50	7.50	7.50	7.50	Min
Flue Diameter (m) per stack	0.45	0.58	0.49	0.20	Max
Normalised Flow rate per stack (Nm^3/s) @ 0% O2, 0 °C, 101.3kPa, dry.	0.83	1.31	1.00	0.18	Min
Actual Flow Rate per stack (Am^3/s)	1.20	1.95	1.43	0.25	Min
Release Temperature per stack (°C)	68	62	69	61	Min
NOx Emission Rate (g/s)	0.069	0.054	0.040	0.007	Max

A6.5. Table A6.11.2: Combined Generator Plant Parameters

Parameter	Stadium	Residential	Hotel	Restriction
Max power out	1798 (kWm)	264 (kWel)	264 (kWel)	-

Parameter	Stadium	Residential	Hotel	Restriction
Net Fuel Consumption of All Plant (litre per hour)	2037.5	68.2	68.2	Max
Net Fuel Input of All Plant (kW)	20600	690	690	Max
Gross Fuel Input for All Plant (kW)	21986	736	736	Max
Excess Air (%)	75	75	75	Min
Height (m)	56.2	121	90.2	Min
Actual Exhaust Velocity (Am/s)	31.1	7.50	7.50	Min
Flue Diameter (m)	0.40	0.25	0.25	Max
Normalised Flow rate per stack (Nm^3/s) @ 0% O2, 0 °C, 101.3kPa, dry.	2.73	0.28	0.28	Min
Actual Flow Rate per stack (Am^3/s)	3.91	0.39	0.39	Min
Release Temperature per stack (°C)	61	80	80	Min
NOx Emission Rate (g/s)	21.375	0.716	0.716	Max
PM Emission Rate (g/s)	1.221	0.041	0.041	Max